Advisory Curriculum Council
Curriculum Guide

In Stage 1, please complete the columns in blue (Topic, Pacing, Unit, Standards, Essential Questions and Enduring Understandings, and Vocabulary and Concepts). In Stage 3, please complete the columns in green (Learning Targets, Materials, Assessments). Add additional rows as needed.

Course Name:	BSCS Biology
Course Number:	0409
Level:	10

Topic	Pacing	Unit	Standards	Essential Questions and Enduring Understandings	Learning Targets	Vocabulary and Concepts	Materials	Assessments
Introduction	1 week	I	SEP 1, Asking Questions, SEP 3, Planning and Carrying Out Investigations, SEP 4, Analyzing and Interpreting Data, and SEP 8, Obtaining, Evaluating, and Communicating Information.	understand that the process of science can be used to study questions about living systems and recognize that science is a part of many aspects of life outside the science classroom.	reflect on the roles that communication and observation play in the nature of science. They will demonstrate their reflection by listing key features necessary for effective communication in relation to recording data, responding to questions, taking notes, keeping track of questions, keeping track of responsibilities, analyzing data, and using science notebooks during	Explanation Evidence Prediction Reasoning	items needed to play the radar game. Part A (per student), 1 termite 1 small paintbrush or cotton swab 1 set of different-colored ballpoint pens blank white paper 1 spiral or composition notebook 1 copy of copymaster En.1, Science Notebook Techniques Rubric Part B (per student) 1 unknown object 1 soft pencil (no. 2) blank drawing paper 1 ruler different-colored pens or pencils	See Engage Test

					assessment; participating in a class discussion about science notebook techniques; answering a question about recognizing the value of using drawings to record observations; and answering questions about the influence that prior knowledge and preconceptions have on scientific observations. 2.record observations by drawing observed objects. They will demonstrate their drawing skills by determining the identity of an unknown object based on an oral description and creating a detailed sketch representing careful observations. 3.begin to recognize the detail and time required to record observations accurately through drawing. They will demonstrate their recognition by drawing the observable properties of an object to describe it			

					sufficiently for a partner who cannot see it, noting the amount of time it takes to draw the outline of an object without being able to see it, and making a detailed drawing. 4.record written observations objectively. They will demonstrate their ability to make observations by writing several observations about termite behavior, discussing their observations with a partner, and revising any observations that are not objective.			
Evolution: Change in Living Systems	7 weeks	1	Science and Engineering Practices (SEPs) SEP 1: Asking Questions SEP 4: Analyzing and Interpreting Data SEP 5: Using Mathematics and Computational Thinking SEP 8: Obtaining, Evaluating, and Communicating	The Human Animal, Evolution: Change Across Time, Products of Evolution: Unity and Diversity	explain how humans are both similar to and distinct from other organisms; demonstrate understanding of how evolution explains unity and diversity of life; use evidence to develop explanations about the living world ---Elaborate: multiple independent sources of	Evidence, Inductive reasoning, Reflex arc , Bipedal, Dendrite, Synapse, Axon, Neuron, Motor, Brain, Hemisphere, Nervous system, Neurotransmitter, Corpus callosum, Sensory cortex, Quadruped, Charles Darwin, Gradualism	flip chart paper Observing Primates assortment of objects to grip 1 padlock and key 1 stopwatch (optional) masking tape (optional) Part B 2 pairs of latex gloves (if using sheep brains) 1 sheep brain felt-tipped markers	See Evolution test

			Information Disciplinary Core Ideas (DCIs) HS-LS4-1: Communicate scientific information that common ancestry and biological evolution are supported by multiple lines of empirical evidence. HS-LS4-2: Construct an explanation based on evidence that the process of evolution primarily results from four factors: (1) the potential for a species to increase in number, (2) the heritable genetic variation of individuals in a species due to mutation and sexual reproduction, (3) competitions for limited resources, and (4) the proliferation of those organisms that are better able to survive and reproduce in the environment.		evidence support biological evolution; natural selection is a major mechanism of evolution that can result in adaptations; life has been shaped by evolution, extinction, and geologic events over vast periods of time; scientific theories are supported by independent sources of evidence; and scientific studies often develop models of natural phenomena to assist in making explanations and predictions. ---Evaluate: multiple independent sources of evidence support biological evolution; natural selection is a major mechanism of evolution that can result in adaptations; life has been shaped by evolution, extinction, and geologic events over vast periods of time; scientific theories are supported by independent sources of evidence; and scientific studies often		different-colored pens or pencils unifying principle cards (1 card per team) Part A (per class of 30, teams of 2) 4 apples 4 oranges (not seedless) 4 tomatoes 4 green peppers 15 scientific calculators 15 paper towels 15 plastic spoons or knives 1 display copy of copymaster 2.1, Seeds of Change Data Table 30 copies of copymaster 2.1, Seeds of Change Data Table (optional) different-colored pens and pencils Part B (per class of 30, teams of 3) 250–500 objects of 1 type (for example, dried bean seeds or peanuts in the shell, if students do not collect their own samples; see Preparations) 20 metric rulers different-colored pens or pencils Part C	

			Performance Expectations LS4.A: Evidence of Common Ancestry and Diversity LS4.B: Natural Selection LS4.C: Adaptation		develop models of natural phenomena to assist in making explanations and predictions.		(per class of 30, teams of 4–5) 21 forceps (optional) 7 sets of beans labeled “starting population” (100 beans total per set; each set consists of 4 bags of 25 beans that are similar in size but different in color) 7 bags of 50 beans of color 1 7 bags of 50 beans of color 2 7 bags of 50 beans of color 3 7 bags of 50 beans of color 4 21 plastic cups or other containers 7 empty bags or cups 7 sets of 4 colored pencils similar to the color of the dried beans 30 sheets of graph paper 7 large sheets of fabric (approximately 1 m × 1 m; see Preparations) 30 copies of the copymaster 2.2, Modeling Change Data Table ---Evidence for Evolution 1 glass beaker with strata (prepared by your teacher) 1 empty glass beaker	

							strata materials 1 set of colored envelopes Plate Tectonics poster board or butcher paper felt-tipped markers -----2 small, clear, flexible metric rulers 2 protractors (jumbo sized, if available) Hominid Skulls glue poster board or butcher paper scissors felt-tipped markers different-colored pens and pencils 1 set of selected human, chimpanzee, and mystery fossil bone pictures	
Homeostasis: Maintaining Dynamic Equilibrium in Living Systems	6 weeks	2	Science and Engineering Practices (SEPs) SEP 1: Asking Questions and Defining Problems SEP 2: Developing and Using Models SEP 3: Planning and Carrying Out Investigations SEP 6: Constructing Explanations and Designing Solutions	The Internal Environment of Organisms, Maintaining Balance in Organisms, Human Homeostasis: Health and Disease	understand that all organisms, organ systems, and cells have an internal and an external environment and are affected by interactions between these environments; understand that organisms' internal systems actively adjust the internal environment to result in a dynamic balance called homeostasis;	Field of view, Magnification, Eyepiece, Ocular lens, Nosepiece, Objective lens, Stage Clips, Stage, Light, Arm, Coarse adjustment, Fine adjustment knob, Diaphragm Small, Base, Slide, Organic molecules, cell respiration, aerobic, anaerobic, glycolysis, krebs cycle, NAD+, electron transport	Can You Stand the Heat? Part A (per team of 4) 4 pairs of safety goggles 4 lab aprons 1 balance 300-mL of distilled water specimen dishes coffee filters paper towels 3 shell-less eggs in a beaker or bowl of vinegar	See Homeostasis Test

			SEP 8: Obtaining, Evaluating, and Communicating Information Disciplinary Core Ideas (DCIs) LS1.A: Structure and Function Crosscutting Concepts (CCCs) CCC 4, Systems and System Models. CCC 6, Structure and Function CCC 7, Stability and Change Performance Expectations HS-LS1-2: Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms. HS-LS1-3: Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis.		recognize that stressors may overwhelm the ability of organisms to maintain their internal environments; understand that individual and collective behavior may influence an individual's ability to maintain homeostasis; and write hypotheses in the form of if-then statements, plan and carry out controlled experiments, understand how to construct explanations of evidence, and conduct ethical analyses.	chain, FAD, pyruvic acid, Diffusion, Water, Gas exchange,Osmosis,Compartment,Concentration gradient,Waste removal,Cell membrane,Environment,Internal conditions,Homeostasis,Selectively permeable,lactate, lactic acid fermentation, mitochondria, coenzyme A, cytochrome, facultative aerobes, facultative anaerobes, hydrolysis, carbon skeletons, obligate aerobes, obligate anaerobes, NADH Nicotinamide adenine dinucleotide, FADH2, Homeostasis, Risk assessment, Ethical issues	4 pairs of gloves 3 500-mL beakers 300-mL of corn syrup solution 300-mL of vinegar plastic wrap 1 slotted spoon different-colored pens or pencils Part B (per team of 2) 2 pairs of safety goggles dropping pipet compound microscope scalpel onion wedge online resource microscope slide and coverslip forceps dissecting needle with cork on the tip 5% salt solution in dropping bottle A Cell Model 2 pairs of safety goggles 2 lab aprons materials to carry out the experiment that you design Regulating the Internal Environment The Circulatory System H.O poster board, butcher paper, or drawing paper (1 sheet per student)	

							art supplies including colored markers Part B Molecular Movement in the Kidney H.O. The Body Responds 3 thermometers or 3 thermistors crushed ice water plastic container stopwatch or clock with a second hand first aid tape paper towels graph paper different-colored pens or pencils Stepping up the Pace breathing rate sensor (optional; if using probeware) heart rate sensor (optional; if using probeware) thermistor or thermometer (optional) alcohol wipes (optional; if using probeware) stepping platform stopwatch or clock with a second hand graph paper different-colored pens or pencils	

							On a Scale of 0-14 Part A (per team of 2) 2 pairs of safety goggles 2 lab aprons 2 pairs of gloves household solutions that your teacher provides pH probe or pH indicator strips jar of tap water for storing pH probe (optional; if using probeware) bottle of distilled water Part B (per team of 3) 3 pairs of safety goggles 3 lab aprons 3 pairs of gloves 50-mL beaker 50-mL graduated cylinder petri dish half (optional; if using pH indicator strips) forceps (optional; if using pH indicator strips) pH probe or pH indicator strips jar of tap water for storing pH probes (optional; if using probeware) distilled water dropping bottle of 0.1	

							M HCl (acid) dropping bottle of 0.1 M NaOH (base) 50-mL of liver or potato homogenate graph paper different-colored pens or pencils How Do They Stay So Cool? "Temperature Regulation in Animals" Homeostasis in Your Critter descriptions and diagrams of your critter from chapter 3 materials for adding to your critter descriptions Hospital Triage 15 copies of copymaster 6.1, Patients' Vital Signs: Preliminary Information 30 copies of copymaster 6.2, Triage Data Sheet 15 copies of copymaster 6.3, First Priority 15 copies of copymaster 6.4, Additional Information Self Defense! Part B (per class of 30, teams of 4) 2 sets of test subject	

							cards from copymaster 6.5, Test Subject Cards (see Preparations) 1 set of scenario cards from copymaster 6.6, Scenario Cards (see Preparations) 30 copies of copymaster 6.7, Complete Scenario Information 1 display copy of copymaster 6.5, Test Subject Cards large piece of butcher paper (optional) Tony"s Brain “Behavioral Disorders and the Brain” video What's The Risk prepared test tube or cup additional materials your teacher supplies	
Energy, matter, and organization	6 weeks	3	Science and Engineering Practices (SEPs) SEP 2: Developing and Using Models SEP 3: Planning and Carrying Out Investigations SEP 6: Constructing Explanations and Designing Solutions SEP 8: Obtaining, Evaluating, and	Physical Fitness and Performance, The Cellular Basis of Activity, The Cycling of Matter and the Flow of Energy in Ecosystems	the conservation and transformation of energy and matter are found in all living systems; organisms release energy by breaking the chemical bonds of food molecules, forming different molecules that have lower amounts of energy; photosynthesis	Atoms, Element, Molecule, Compound, Hypothesis, Biocide, Synthesis, Decomposition, Ion, Ionization Compounds, ph, Chlorophyll, ATP, ADP, Carbohydrate, Cellulose, Lipid, Protein, Amino Acids, Polypeptide, RNA, DNA	What Determines Fitness? transparencies (optional) transparency marker (optional) 30 copies of copymaster 7.1, Physical Activity Analysis 1 copy of copymaster 7.2, Class Activity Level Profile	

			Communicating Information Disciplinary Core Ideas (DCIs) LS1.A: Structure and Function LS1.C: Organization for Matter and Energy Flow in Organisms Crosscutting Concepts (CCCs) CCC 2, Cause and Effect: Mechanism and Prediction CCC 6, Structure and Function Performance Expectations HS-LS1-2: Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.		transforms light energy into chemical energy, with dramatic effects on all living systems; energy flow through ecosystems and matter cycles in them; well-designed investigations collect data, compare results to controls, draw conclusions and report findings		30 copies of copymaster 7.3, Dietary Analysis What is in the food you eat? 30 pairs of safety goggles 30 lab aprons 30 pairs of plastic gloves 6 500-mL beakers 18 10-mL graduated cylinders 114 18 × 150-mm test tubes 6 test-tube clamps 18 test-tube racks 6 dropping pipets 6 hot plates 6 dropping bottles of Benedict's solution labeled "CAUTION: Irritant" (total 60 mL) 6 dropping bottles of biuret solution labeled "WARNING: Strong irritant" (total 24 mL) 6 dropping bottles of indophenol solution labeled "CAUTION: Irritant" (Note: Indophenol must be fresh. Keep it refrigerated between uses and order a new supply each year.) (total 24 mL) 6 screw-cap jars of isopropyl alcohol (99%)	

							labeled “WARNING: Flammable liquid” (total 120 mL) 6 dropping bottles of Lugol’s iodine solution labeled “WARNING: Poison if ingested, irritant” (total 24 mL) 50-mL food samples from each of the 6 food groups (see Preparations), such as • fruits (apples, oranges, bananas) • vegetables (potatoes, onions, broccoli stalks, squash, tomatoes) • meats (egg whites, liver) • milk (cheeses, milk) • grains (breakfast cereals, fresh pasta, bread) • fats, oils, and sweets (egg yolks, desserts, snack foods) water 2 2½-gal waste pails 6 lunch-sized, brown paper bags 12 glass-marking pencils For the positive controls: (per class of 30) 36 18 × 150-mm test tubes 30 10-mL graduated cylinders	

							6 spatulas or dropping pipets for the lab tables 24 100-mL beakers 300 mL of 1% ascorbic acid (vitamin C; see Preparations) 6 pats of regular margarine or small bottles (dropping-bottle size) of vegetable oil (see Preparations) 300 mL of 6% suspension of gelatin (see Preparations) 300 mL of 10% solution of glucose (see Preparations) 300 mL of 6% suspension of starch (see Preparations) 12 glass-marking pencils For the negative controls: (per class of 30) 36 100-mL beakers tap water You are what you eat. 4 pairs of safety goggles 4 laboratory aprons 2–3 unsalted soda crackers other materials to be decided by each team Part B “Introduction to	

							Biosynthesis” Structures and Functions “Muscle Movement at the Molecular Level” 1 brass brad 25-cm piece of string rubber bands roll of tape scissors sheet of thin cardboard different-colored pens or pencils	
Continuity: Reproduction and Inheritance in Living Systems	6 weeks	4	B1.1 Scientific Inquiry, B1.1A, B1.1B, B1.1C, B1.1D, B1.1E; B1.2 Scientific Reflection and Social Implications, B1.2A, B1.2B, B1.2C, B1.2D, B1.2E; B4.1 Genetics and Inherited Traits, B4.1A, B4.1B; B4.2 DNA, B4.2A, B4.2B, B4.2C, B4.2D, B4.2E	Reproduction in Humans and Other Organisms, Gene Action, Continuity of Information through Inheritance	compare and contrast the strategies that different organisms use for reproduction, explain that the continuity of a species depends on the transfer of genetic information, describe the structure of genetic material, explain how genetic information is expressed, illustrate how sexual reproduction and mutation increase genetic variation and why this is important for the evolution of a species, and appreciate the current and potential impact that technology has on our lives	nucleoid, endospores, archaebacteria, eubacteria, cyanobacteria, chemoautotrophs, nitrifying Bacteria, denitrifying bacteria, host, immunity, antibodies, vaccines, cytoplasm, nucleotides, uracil, mRNA, tRNA, rRNA, codon, amino acids, transcription, rna polymerase, protein synthesis, DNA protein synthesis, translation, translocation, polypeptide, viruses, capsid, pathogenic, retrovirus		

Development: Growth and Differentiation in Living Systems	3 weeks	5	B1.1 Scientific Inquiry, B1.1A, B1.1B, B1.1C, B1.1D, B1.1E; B1.2 Scientific Reflection and Social Implications, B1.2A, B1.2B, B1.2C, B1.2D, B1.2E; B2.4 Cell Specialization, B2.4A, B2.4B, B2.4C; B2.5 Living Organism Composition, B2.5A, B2.5B, B2.5C, B2.5D; B4.3 Cell Division — Mitosis and Meiosis, B4.3A, B4.3B, B4.3C	Processes and Patterns of Development, The Human Lifespan	cells divide through a process known as mitosis; embryonic development involves processes of growth and differentiation; humans grow and develop in different ways through life (physically, cognitively, emotionally, and socially); culture influences how human life stages are interpreted and experienced; and as scientists answer specific questions, knowledge accumulates to address larger questions.	Active transport Energy, cancer cells, Cell, Cell Membrane, Cell wall, Centrioles, Chloroplasts, chromosomes, Cytokinesis, Cytoplasm, Cytoskeleton, diffusion, Endoplasmic reticulum, Eukaryotes, Genes, Golgi apparatus, Interphase, Lysosomes, metabolism, Mitochondria, Mitosis, Nucleus, Organelle, Osmosis, Passive Transport, Prokaryotes, Prophase, Ribosomes, Vacuoles, Vesicles		
Ecology: Interaction and Interdependence in Living Systems	6 weeks	6	B1.1 Scientific Inquiry, B1.1A, B1.1B, B1.1C, B1.1D, B1.1E; B1.2 Scientific Reflection and Social Implications, B1.2A, B1.2B, B1.2C, B1.2D, B1.2E; B3.4 Changes in Ecosystems, B3.4A, B3.4B, B3.4C; B3.5 Populations, B3.5A, B3.5B, B3.5C; B2.2	Interdependence among Organisms, Decision Making in a Complex World	a community of organisms interacts with the abiotic environment to form ecosystems; ecosystems are complex, but it is possible to analyze them; populations are limited in size by the amount of available resources; ecosystems can be modified by human actions; and human actions follow from decisions, which are made within a	Producers, Consumers, Decomposers, Community, Microorganisms, Food Chain, Food web, Chemical Energy, Photosynthesis, Hypothesis, Population, Mortality, Birthrate, Biotic, Abiotic, Limiting Factor, Resources, Dispersal, Herbivore, Carnivore, Omnivore, Niche, Predator-prey relationship, Competitive		

					cultural context.	Relationship, Symbiotic Relationship, Parasitic Relationship, Scavengers, Energy Pyramid, Biodiversity, Decomposition, Chlorophyll, Carbon cycle, Ecology,		